IN THE CLAIMS:

1. (currently amended)A semiconductor device comprising:

a germanium substrate having a first type of doping;

a nucleation layer of group III-V materials disposed upon said germanium substrate, wherein the deposition of said nucleation layer also forms a germanium junction forming layer on a portion of said germanium substrate, said germanium junction forming layer being actively doped with a constituent element of said nucleation layer, said actively doped germanium junction forming layer having an opposite doping to said first type of doping;

at least one layer of a group III-V semiconductor material adjacent to and disposed upon said nucleation layer;

~~a device formed on one of said at least one layer of said group III-V semiconductor material, said device selected from the group consisting of transistors, resistors and diodes;~~

a first electrical contact formed on said germanium substrate; and

a second electrical contact formed on ~~at least~~ one of said at least one layer of a group III-V semiconductor material; and

a third electrical contact formed on said one or another of said at least one layer, said third electrical contact electrically coupled to said second electrical contact to form a device, said device selected from the group consisting of a transistor, a resistor and a diode.

2. (original) The semiconductor device of claim 1, wherein said constituent element is selected from the group consisting of Phosphorus, Arsenic, and a combination of Phosphorus and Arsenic.

3. (currently amended) The semiconductor device of claim ~~1~~ 2, wherein said germanium junction forming layer also being actively doped with a second constituent element from said at least one layer of said group III-V semiconductor material.

4. (original) The semiconductor device of claim 1, wherein said second constituent element is selected from the group consisting of Phosphorus, Arsenic, and a combination of Phosphorus and Arsenic.

5. (currently amended) The semiconductor device of claim 1 further comprising ~~a second device~~ a fourth electrical contact formed on ~~another~~ said one or another of said at least one layer of said group III-V semiconductor material ~~wherein said at least one layer of said group III-V semiconductor materials comprises a plurality of layers of said group III-V semiconductors materials~~, said fourth electrical contact electrically coupled to said second electrical contact to form a second device, said second device selected from the group consisting of a transistor~~s~~, a resistor~~s~~ and a diode~~s~~.

6. (original) The semiconductor device of claim 1, wherein the level of said first dopant is a function of a desired frequency operating range and photo-response characteristics of the semiconductor device.

7. (original) The semiconductor device of claim 1, wherein said nucleation layer is lattice-matched to said germanium substrate.

8. (original) The semiconductor device of claim 7, wherein said nucleation layer is an InGaP layer.

9. (withdrawn) The method of claim 1, wherein compression fitting at least one layer of said hydrophobic, open-cell foam structure comprises:

(a) forming an insulation material by:

coupling an interleaved fibrous layer to a first layer of said hydrophobic, open-cell foam structure;

coupling a second layer of said hydrophobic, open-cell foam structure to said interleaved fibrous layer such that said interleaved fibrous layer is sandwiched between said first layer and said second layer;

coupling a spacer to each end of said interleaved fibrous layer, wherein each spacer is contained between said first layer and said second layer; and

(b) compression fitting said insulation material between said adjacent pair of frames such that said first layer substantially covers at least one of the plurality of stringers.

10. (withdrawn) The method of claim 1, wherein compression fitting at least one layer of said hydrophobic, open-cell foam structure comprises:

(a) forming a first insulation material by:

coupling a first interleaved fibrous layer to a first layer of said hydrophobic, open-cell foam structure;

(b) forming a second insulation material by:

coupling a second interleaved fibrous layer to a second layer of said hydrophobic, open-cell foam structure;

(c) compression fitting said first insulation material between said adjacent pair of frames such that said first layer substantially covers at least one of the plurality of stringers;

(d) coupling a plurality of spacers to a top surface of said first insulation material; and

(e) coupling said second insulation material between said adjacent pair of frames such that said plurality of spacers are contained between said first insulation material and said second insulation material, therein forming an air gap between said first insulation material and said second insulation material, wherein said second layer is compression fit between said adjacent pair of frames.

11. (withdrawn) The method of claim 10, wherein said spacers are directly coupled to and between said first interleaved fibrous layer and said first layer.

12. (withdrawn) The method of claim 10, wherein said spacers are directly coupled to and between said first interleaved fibrous layer and said second interleaved fibrous layer.

13. (withdrawn) The method of claim 1, wherein compression fitting at least one layer of said hydrophobic, open-cell foam structure comprises:

(a) compression fitting a first layer of said hydrophobic, open-cell foam structure between said adjacent pair of frames such that said layer substantially covers at least one of the plurality of stringers;

(b) coupling a plurality of spacers onto said first layer;

(c) forming an insulation material by:

coupling an interleaved fibrous layer to one layer of said hydrophobic, open-cell foam structure;

coupling a second layer of said hydrophobic, open-cell foam structure to said interleaved fibrous layer such that said interleaved fibrous layer is sandwiched between said first layer and said second layer; and

(d) coupling said insulation material between said adjacent pair of frames such that said plurality of spacers are contained between said first layer and said insulation material, therein forming an air gap between said insulation material and said first layer, wherein said second layer is compression fit between said adjacent pair of frames.

14. (withdrawn) The method of claim 1 further comprising:

introducing a cutout portion to one layer of said at least one layers prior to compression fitting said one layer between said frames;

compression fitting said one layer of said hydrophobic, open-cell foam structure between said adjacent pair of frames such that said layer substantially covers a top section and a bottom section of a c-shaped frame element, wherein said c-shaped frame element comprises a portion each of said frames.

15. (withdrawn) An insulation system for use in an aircraft fuselage, the fuselage having an outer skin, a plurality of stringers coupled to and extending latitudinally along an outer skin, and a plurality of frames coupled to a plurality of stringers and the outer skin and extending longitudinally along the outer skin, each of the plurality of frames having a c-shaped frame element coupled to an I-shaped frame element, the insulation system comprising:

at least one layer of said hydrophobic, open-cell foam structure compression fit between an adjacent pair of the plurality of frames and closely coupled to the outer skin, wherein said at least one layer substantially covers at least one of the plurality of stringers, wherein said hydrophobic, open-cell foam structure comprises a melamine-based, thermosetting open-cell foam structure; and

a trim piece coupled to said at least one layer.

16. (cancelled)

17. (withdrawn) The insulation system of claim 15, wherein said hydrophobic, open cell foam structure comprises a melamine-based, thermosetting open cell foam structure being compressible to between about 0.5 and 10 percent compression.

18. (withdrawn) The insulation system of claim 15 further comprising a layer of non-woven spun laced fiber fabric coupled between said at least one layer and said trim piece.

19. (withdrawn) The insulation system of claim 15, wherein a portion of said at least one layer located in closest proximity to the outer skin is removed to provide a drainage channel.

20. (withdrawn) The insulation system of claim 15, wherein said at least one layer located in closest proximity to the outer skin has a cut out portion, said cut out

portion allowing said at least one layer to be compression fit to an inner extending portion and a bottom portion of one of said c-shaped frame elements.

21. (withdrawn) The insulation system of claim 18, wherein said at least one layer comprises:

a first layer of a hydrophobic, open-cell foam structure compression fit between an adjacent pair of the plurality of frames and closely coupled to the outer skin, wherein said first layer substantially covers at least one of the plurality of stringers;

a second layer of said hydrophobic, open-cell foam structure closely coupled to said trim piece; and

an interleaved fibrous layer sandwiched between said first layer and said second layer.

22. (withdrawn) The insulation system of claim 21, wherein said first layer has a cut out portion, said cut out portion allowing said first layer to be compression fit to an inner extending portion and a bottom portion of one of said c-shaped frame elements.

23. (currently amended) A semiconductor device comprising:

a germanium substrate having a first type of doping;

a nucleation layer of group III-V materials disposed upon said germanium substrate;

at least one layer of a group III-V semiconductor material adjacent to and disposed upon said nucleation layer, wherein the deposition of said nucleation layer and said at least one layer also forms a germanium junction forming layer on a portion of said germanium substrate, said germanium junction forming layer being actively doped with a constituent element of said nucleation layer and a second constituent element of said at least one layer, said actively doped germanium junction forming layer having an opposite doping to said first type of doping;

a device formed on one of said at least one layer of said group III-V semiconductor material, said device selected from the group consisting of transistors, resistors and diodes;

a first electrical contact formed on said germanium substrate; ~~and~~

a second electrical contact formed on ~~at least~~ one of said at least one layer of a group III-V semiconductor material; and

a third electrical contact formed on said one or another of said at least one layer, said third electrical contact electrically coupled to said second electrical contact to form a device, said device selected from the group consisting of a transistor, a resistor and a diode.

24. (original) The semiconductor device of claim 23, wherein said constituent element is selected from the group consisting of Phosphorus, Arsenic, and a combination of Phosphorus and Arsenic.

25. (original) The semiconductor device of claim 23, wherein said second constituent element is selected from the group consisting of Phosphorus, Arsenic, and a combination of Phosphorus and Arsenic.

26. (original) The semiconductor device of claim 23, wherein said second constituent element is selected from the group consisting of Phosphorus, Arsenic, and a combination of Phosphorus and Arsenic.

27. (new) The semiconductor device of claim 1, further comprising coupling said first electrical contact with said second electrical contact to form an optoelectronic integrated circuit.

28. (new) The semiconductor device of claim 23, further comprising coupling said first electrical contact with said second electrical contact to form an optoelectronic integrated circuit.